624.7
SURVEYS

NOT FOR PUBLICATION
5230(4500)

Furniss RLD
① Buckhorn WJB
Buffam GERJ
Carolin VMC
Coulter JAKC
Guy
③ Klein WAK
Mitchell
② Orr DMO
Thomas
Wear
④ Wright RHW

ENGELMANN SPRUCE BEETLE CONDITIONS IN THE SPRUCE STANDS OF FOREST SERVICE REGION 4

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Ogden, Utah

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By

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INTRODUCTION

The Engelmann spruce beetle, Dendroctonus Engelmanni Hopk., is recognized as one of the most destructive pests of Engelmann spruce in U. S. Forest Service Region 4. History shows that in this region many destructive outbreaks have occurred in the past. Until the development of effective chemical treatments in recent years was successful, little was or could be done to effectively combat this pest. In the past few years several serious outbreaks have developed and considerable effort has been expended through logging and chemical treatment to reduce the losses and prevent expansion of infested areas. Accomplishments to date have been noteworthy in that attack against the outbreaks by logging and direct control have reduced the beetle population in treated areas and held losses to a minimum.

Forest personnel are becoming increasingly effective in detecting and reporting of abnormal populations of Engelmann spruce beetle. In spruce type, prompt detection is essential if losses are to be minimized. To insure that control efforts are directed toward infestations that require treatment, entomologists evaluate populations to determine their destructiveness and potential for future damage. Evaluations are presented in this report for each outbreak examined during the season. A map of Region 4 showing the relative position of the infestations and detailed maps of each infestation are appended.

PAYETTE NATIONAL FOREST

In 1958 the Payette National Forest notified the Division of Forest Insect Research of a possible buildup of Engelmann spruce beetle in the drainage of the Fisher Creek timber sale which lies within the heart of the spruce type on the forest. During a biological evaluation an active infestation involving approximately 2,000 trees was found. Evidence showed the beetles had developed in slash and cull logs originating from a sale that had recently become inactive. Both one- and two-year generation strains were present.

During the fall of 1958 approximately 800 infested trees were logged and 250 trap trees felled. Chemical control of the beetles within stumps, slash, cull logs, trap trees, and newly attacked standing trees was started in August 1959. An extremely high Engelmann spruce beetle potential still remains in the Fisher Creek drainage. Therefore, control action should be continued next year to further reduce beetle populations in this infestation.

A selective cut timber sale in Brown Creek is due to close this year and while it was mostly a fir cut, enough spruce culls and stumps remain to warrant concern. It was determined that some slash and standing trees were already infested with spruce beetles. If possible this infested material should be burned or treated before beetle flights next spring.

In another area between Brown and Fisher Creeks cold-decked spruce logs from a road right-of-way became infested. To insure that beetles do not emerge and attack standing trees, the infested logs should be removed or treated.

Two areas of spruce blowdown in Elk Creek and Lick Creek were examined for spruce beetle activity. The blowdown occurred in November 1958 and covered about 50 acres in each drainage. Most of the blowdown occurs as small groups of about 50 trees each. The down trees contained broods of Engelmann spruce beetle which could develop epidemic tendencies and move to standing trees in the next year or two. These areas, plus any other spruce areas where blowdown has occurred, should be watched closely to determine if excessive beetle populations are developing.

TARGHEE NATIONAL FOREST

At the request of the Targhee National Forest an area of spruce beetle activity in upper west Targhee Creek near Henrys Lake, Idaho was examined. The examination covered about 100 acres and it was estimated that about 20-30 trees were infested. Approximately 10 of these trees had been attacked in 1959 by the one-year generation strain. The remainder were 1957 attacked trees with two-year strain adults overwintering at the base.

Trees infested in 1957 and 1958 were heavily woodpeckered with the bark removed from an average of 80 percent of the infested bole on a majority of the trees. In 1958 the woodpeckers worked to within 6 inches of the ground line. These predators should reduce the population of the one-year strain to an endemic level. If a light or late winter occurs the woodpeckers will undoubtedly feed aggressively upon the overwintering adults. Adults surviving the winter will be faced with very limited amounts of spruce remaining in the area. It was concluded that in upper West Targhee Creek there was no going spruce beetle epidemic and existing populations will be greatly reduced by natural factors.

TETON NATIONAL FOREST

Aerial detection surveys during the fall of 1959 revealed two areas of suspected Engelmann spruce beetle activity in Nation Creek and Squaw Basin on the Teton National Forest. Biological evaluation in and around an active logging area in Squaw Basin revealed only an endemic population.

Nation Creek contains a small infestation of approximately 75 infested trees on 50 acres concentrated in moist bottoms. While this infestation showed a definite decrease over 1957 attacks it may increase in severity in the future since windthrow is present in the area. Continued surveillance is indicated.

BRIDGER NATIONAL FOREST

Since 1955 logging, chemical treating, and felling of trap trees have been employed to contain a serious epidemic of Engelmann spruce beetle in the vicinity of Gypsum Creek on the Bridger National Forest. For the most part, these practices have effectively contained the infestation with the exception of flights that reinfested the area in and around Moose Creek on the north side of Little Sheep Mountain in 1958 and 1959.

The north slopes of Little Sheep Mountain are currently being logged and treated. Woodpeckers migrated from the old infested area and are helping to reduce brood populations.

Jim Creek, the southern border of the main infestation, was also examined. Brood counts revealed epidemic populations were present. However, logging and chemical control measures are expected to reduce the beetle populations to a point where there will be insufficient numbers to infest surrounding drainages.

Throughout the infested area a decided increase of parasites--genus Coeloides--was noted. Populations of this parasite now average about 3 to 5 per square foot at breast height. Woodpecker populations are also increasing. Nevertheless, it does not seem likely that existing natural control factors can cause sufficient brood mortality to reverse the infestation trend. Therefore, continuation of present control practices will be necessary to prevent flareups of this epidemic.

Aerial detection surveys indicated between 100 and 300 faded Engelmann spruce trees in the upper end of the Porcupine drainage. It was the observer's impression that these trees probably were attacked by the Engelmann spruce beetle. Ground checks of these faded trees should be made next spring to determine the causal agent and to assess its seriousness.

UINTA-ASHLEY-WASATCH

Soapstone. An epidemic known as the Soapstone infestation is centered in the high country of the Uinta National Forest where it joins the Ashley and Wasatch National Forests. The epidemic area extends from Wolf Creek through Soapstone basin, over Iron Mine Mountain to the Provo River on the north, and across the Duchesne River drainage to Rock Creek on the east. The west border is in the neighborhood of Heber Mountain. Shortly after detection of the outbreak on June 30, 1958 an all-out effort to control this infestation was initiated. All available logging operators were moved into the area to cut beetle-infested timber. Stumps and gull topswere sprayed and in some areas that could not be logged immediately infested standing trees were treated.

Logging and chemical treatment started again in 1959 as soon as snow melt permitted access to the areas. Examination through the summer and fall showed that the beetle population has been drastically reduced and consequently fewer trees were attacked in 1959. Brood samples showed less brood density per square foot of sample than was recorded in the fall of 1958. Nevertheless, the ability of the brood to survive, emerge, and attack appears to have remained at epidemic levels and it can be expected that an increased number of trees may be attacked during next year's flight period unless remaining material is logged or treated.

Biological evaluations were made in several spruce areas adjacent to the main infestation as follows:

ASHLEY NATIONAL FOREST

South Fork, Rock Creek. This drainage contains a considerable volume of mature to overmature spruce and is on the eastern perimeter of the main infestation. Operational surveys conducted by N. F. A. personnel resulted in an estimated infestation of slightly over 2,000 infested trees. Nearly 1,000 of these were 1957 attacked trees and contained overwintering adults at the base of the trees. The remaining trees were attacked by the one-year strain in 1959. A biological evaluation in this area shows insect predator and parasite activity is higher than for the rest of the Soapstone infestation. Woodpeckers are quite active in the area. While the beetle population in this area does not show as strong an upward trend as the rest of the infestation, conditions are such that it may become very serious in the next couple of years. The forest is currently surveying roads into these stands with the intent of logging the mature spruce. Treatment of unmerchantable trees should be used as a supplement to insure that this epidemic does not become too destructive.

Raspberry Draw. Aerial detection surveys indicated Engelmann spruce beetle activity in this area which was confirmed by ground examination. Raspberry Draw is a side drainage of Lake Fork Creek and is located about 15 miles east of the edge of the Soapstone epidemic. Currently, approximately 200 trees are infested in one area of 200 acres. Biological evaluateions indicate that this infestation can be expected to show slight decreasing tendencies next year. In spite of this possibility it is recommended that the area be checked closely next spring to determine brood survival. Information from this evaluation may indicate that control action may be desirable next fall.

WASATCH NATIONAL FOREST

By agreement between forests, the Uinta National Forest chemically treated the infested stands on the north side of Iron Mine Mountain and immediate surrounding areas on the Wasatch National Forest. This area is considered as part of the Soapstone infestation.

At the request of the Wasatch National Forest, examinations were made in the North Fork of the Provo River and headwaters of the Hayden Fork. It was determined that only emdemic populations of Engelmann spruce beetle were present. These areas are overstocked with mature to overmature spruce which is highly susceptible to attack and close field surveillance should be maintained over these spruce stands.

MANTI-LA SAL

After two years of logging and chemical treatment, Engelmann spruce beetle populations have been greatly reduced in Dark and Unknown Canyons on the eastern side of Mt. Peale. These areas encompass about 1,000 acres of Federal, State, and private lands near Moab, Utah.

This year snow conditions were such that early spring treating was possible. Control operations to date have effectively prevented any extensive spread into surrounding overmature spruce stands.

Biological evaluations, however, show heavy one- and two-year generation strains in untreated infested slash and standing trees. Natural control factors are not expected to exert unusual pressures on existing populations.

In view of continued population levels that have the potential for causing considerable numbers of new attacks, further control efforts will be required.

DIXIE NATIONAL FOREST

A small Engelmann spruce beetle infestation, approximately 700 acres, in the Griffin Springs area of the Aquarius Plateau is continuing at a moderately high level. These stands have a long history of spruce beetle activity. The current infestation is the result of populations emerging from logging slash after cutting had ceased in the area beetles attacked standing trees in 1957. Logging and chemical control measures were initiated in 1958. No control was carried on in 1959. However, examination during the late summer revealed moderately high residual populations persisting. Indications are that this population will probably continue to increase in severity unless additional control work is undertaken.

DISCUSSION AND RECOMMENDATIONS

A discussion of the present Engelmann spruce beetle conditions should be prefaced with a review of conditions a year ago so that comparisons can be made. Last year four new outbreaks were discovered. They were the Soapstone infestation on the Wasatch, Ashley, and Uinta National Forests; Mt. Peale infestation near Moab, Utah; Fisher Creek on the Payette National Forest; and the Aquarius Plateau area on the Dixie National Forest. Altogether, they contained over 80,000 infested trees. Each area was considered highly epidemic. The present conditions show that although epidemic

tendencies remain, the number of infested trees has been greatly reduced. Credit for this reduction must go to the vigorous and efficient control program carried on by the land managers concerned. It does not appear that biotic factors were responsible for any significant brood reduction. Climate did not adversely affect brood populations last winter. Conversely, the following factors could influence future trends of the infestations. In all but Raspberry Draw on the Ashley National Forest (a new infestation) and the Gypsum Creek, Bridger National Forest, the brood densities are somewhat lighter than was recorded last year. The Gypsum Creek infestation now has a Coeloides population of between 3 and 5 per square foot of sample at breast height. Woodpecker populations are increasing and control work is reducing the amount of infested material. Therefore, woodpeckers are expected to exert considerable pressure on the brood in the untreated standing trees this winter. Nevertheless, it is expected that at least some buildup will take place in every area if broods are not further reduced through control and logging.

Summary of basic population density figures for 1959 attacked trees obtained on areas evaluated fall of 1959.

Forest	Rough estimate Acres	Rough estimate Trees	Brood density per sq.ft.	Gallery starts per sq.ft.	Gallery inches per sq.ft.
Targhee N.F.					
West Targhee Cr.	100	10	63.0	14.0	7.6
Teton N.F.					
Nation Cr.	50	75	162.0	8.8	60.4
Bridger N.F.					
Jim Cr.			213.3	7.0	26.0
Little Sheep Mt.			188.1	5.4	16.2
Ave./Infestation			206.1	6.4	22.0
Ashley N.F.					
Raspberry	200	200	283.5	8.0	68.0
Manti-LaSal					
Unknown Can.	1,000	400	94.5	6.2	42.0

F O R E S T S E R V I C E R E G I O N 4

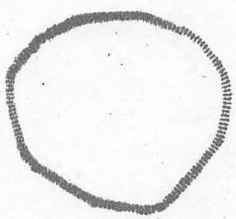
Location of Engelmann spruce beetle infestations, 1959

are circled in red.

Salmon River
PAYETTE N.F.
SALMON N.F.
PAYETTE N.F.
BOISE N.F.
CHALLIS N.F.
BOISE
SALMON N.F.
TARGHEE N.F.
TARGHEE N.F.
CHALLIS N.F.
IDAHO FALLS
SAWTOOTH N.F.
Snake River
IDAHO
TARGHEE N.F.
TETON N.F.
POCATELLO
CARIBOU N.F.
CARIBOU N.F.
BRIDGER N.F.
SAWTOOTH N.F.
CARIBOU N.F.
HUMBOLDT N.F.
HUMBOLDT N.F.
PARADISE VALLEY
WYO.
LOGAN
GREAT SALT LAKE
CACHE N.F.
OGDEN
Humboldt River
ELKO
HUMBOLDT N.F.
WASATCH N.F.
ASHLEY N.F.
SALT LAKE CITY
WASATCH N.F.
UINTA N.F.
VERNAL
NEVADA
WASATCH N.F.
PROVO
UTAH
RENO
UINTA N.F.
ASHLEY N.F.
Green River
HUMBOLDT NATIONAL FOREST
ELY
NEPHI
CARSON CITY
FISHLAKE N.F.
EPHRAIM
MANTI-LA SAL N.F.
SEVIER
TOIYABE N.F.
FISHLAKE N.F.
TOIYABE N.F.
HUMBOLDT N.F.
FISHLAKE N.F.
MILFORD
MANTI-LA SAL N.F.
DIXIE N.F.
Colorado River
DIXIE NATIONAL FOREST
ST. GEORGE
TOIYABE N.F.
LAKE MEAD
LAS VEGAS
COLORADO RIVER

LEGEND

DRAINAGES

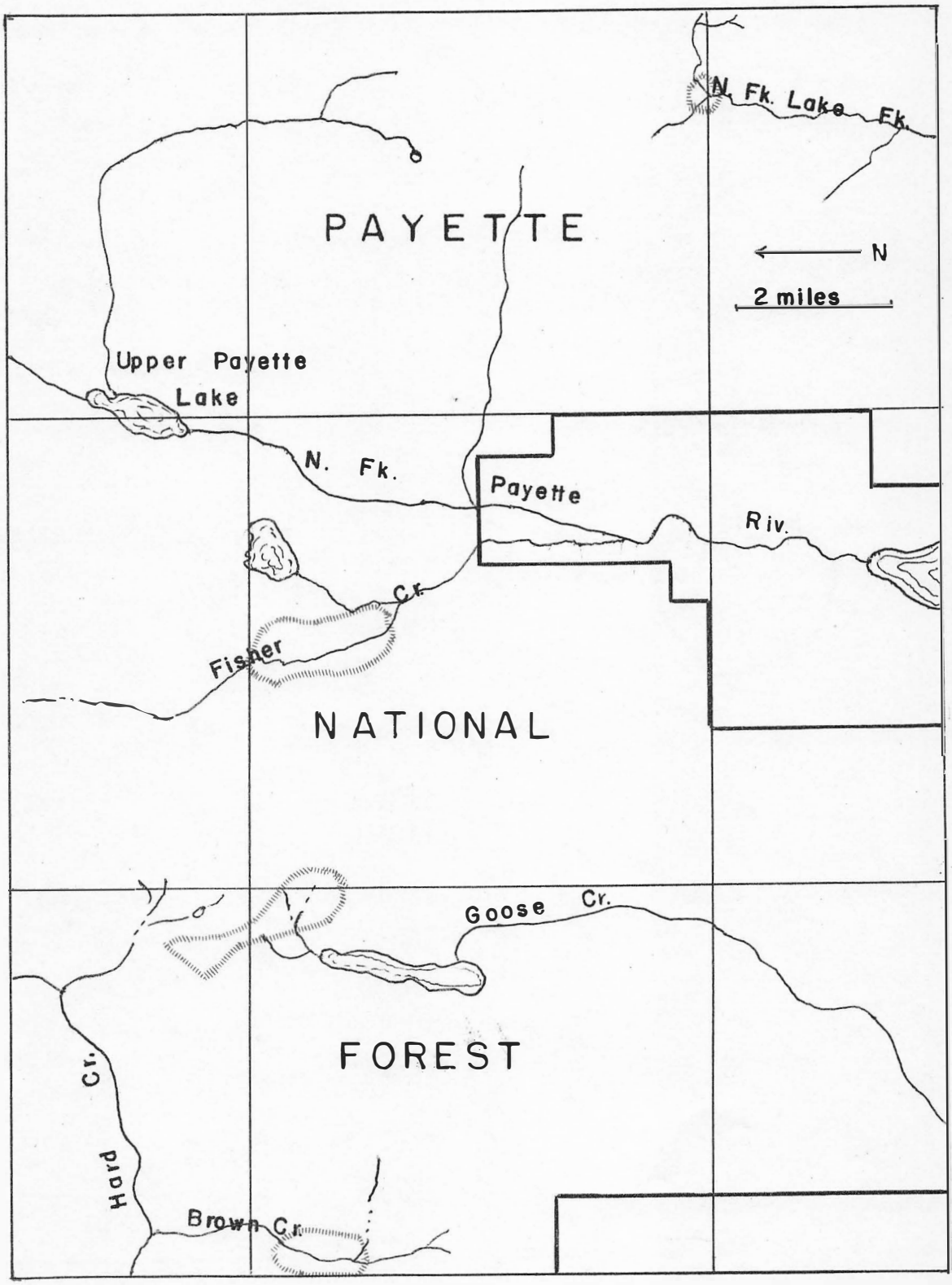


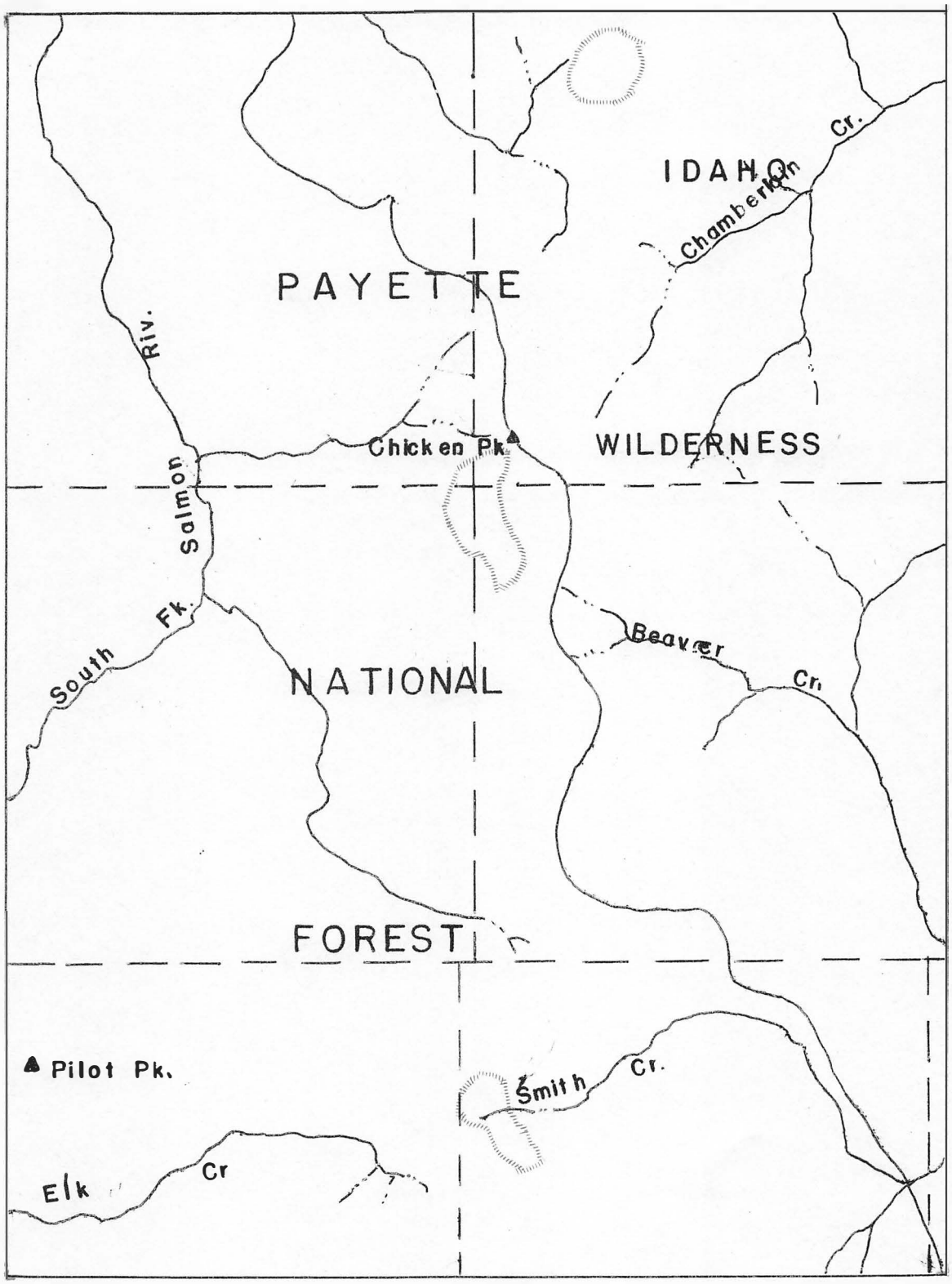
INFESTATION BOUNDARIES

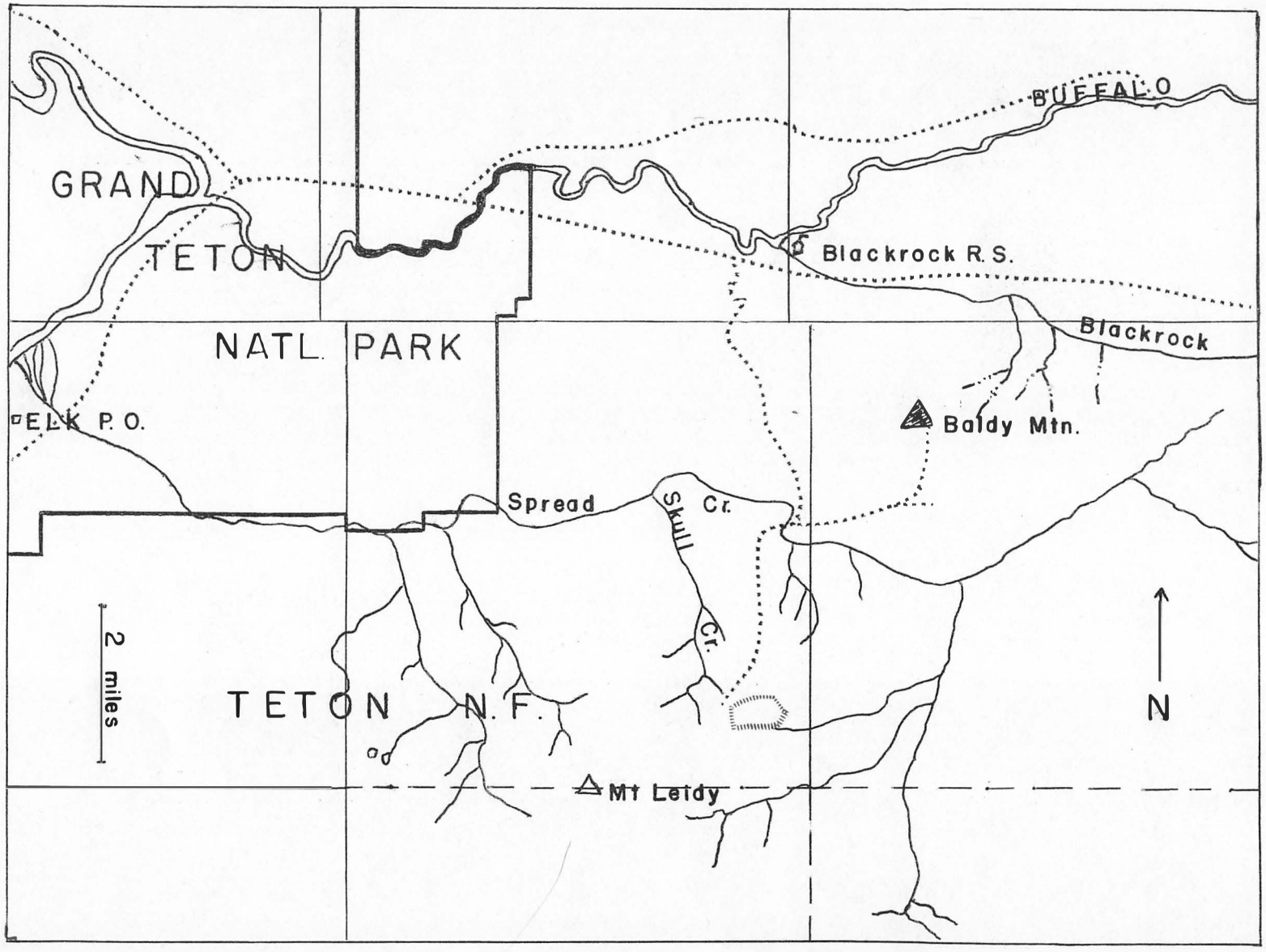
..... ROADS

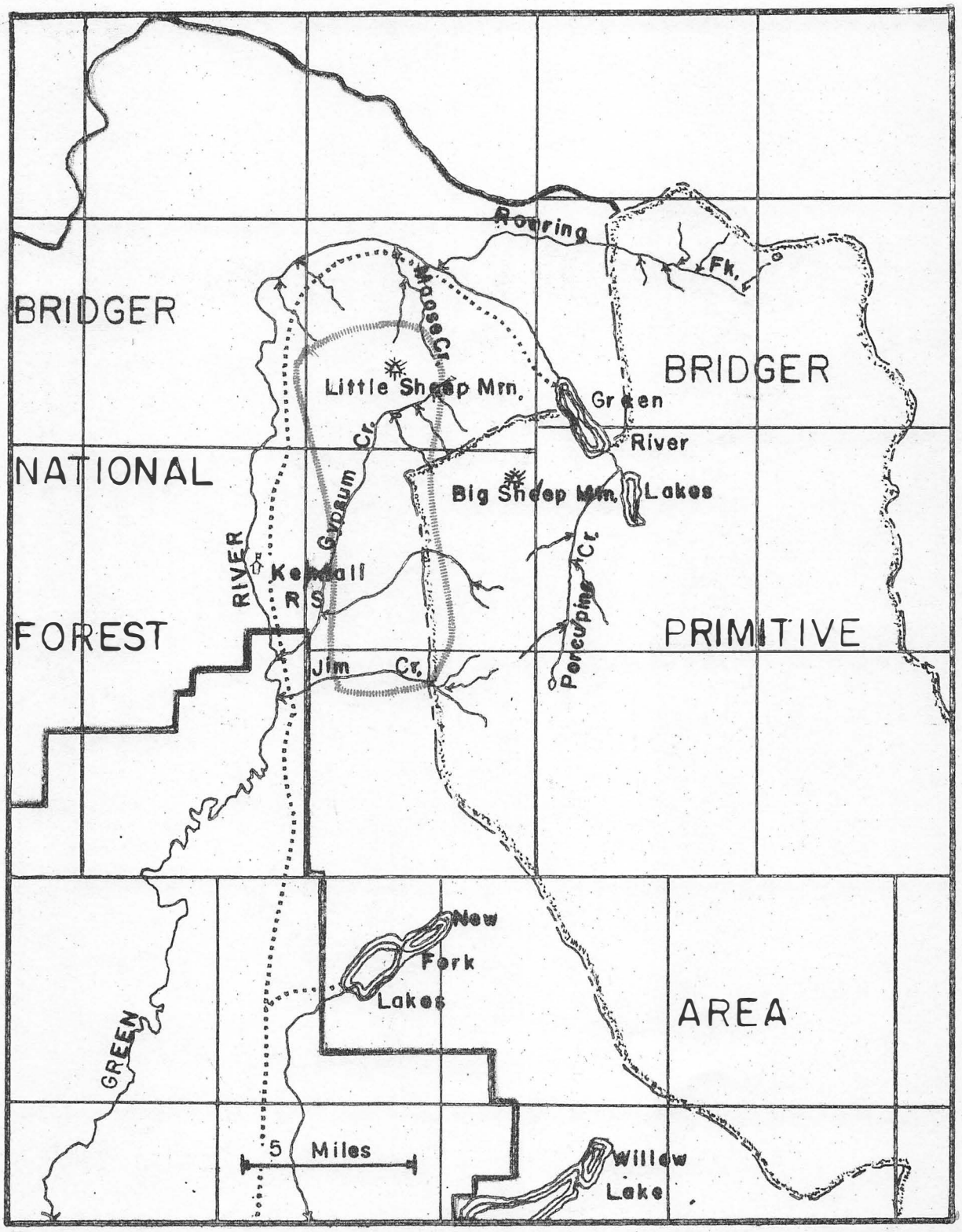
NOTE

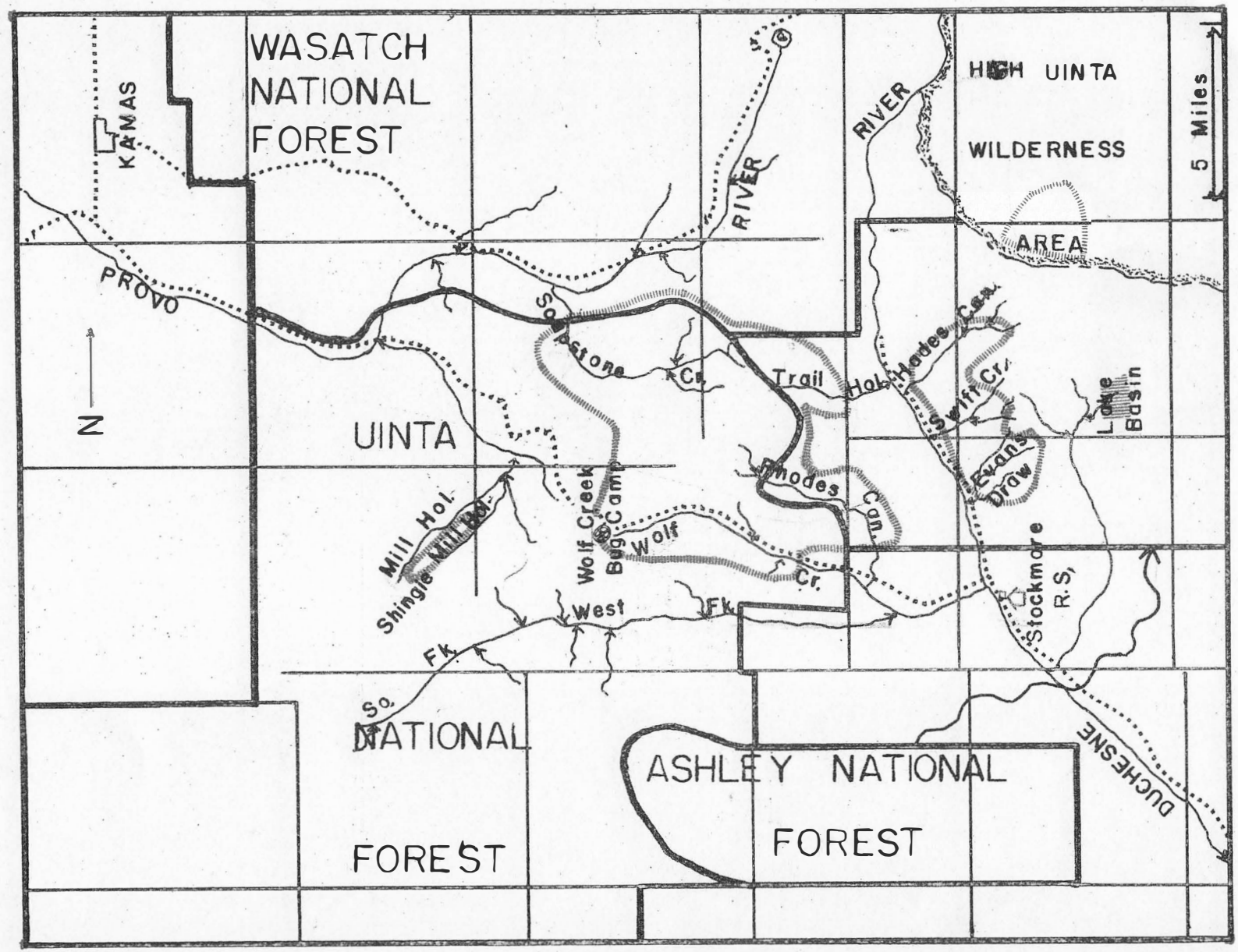
INDIVIDUAL MAPS VARY AS TO SCALE

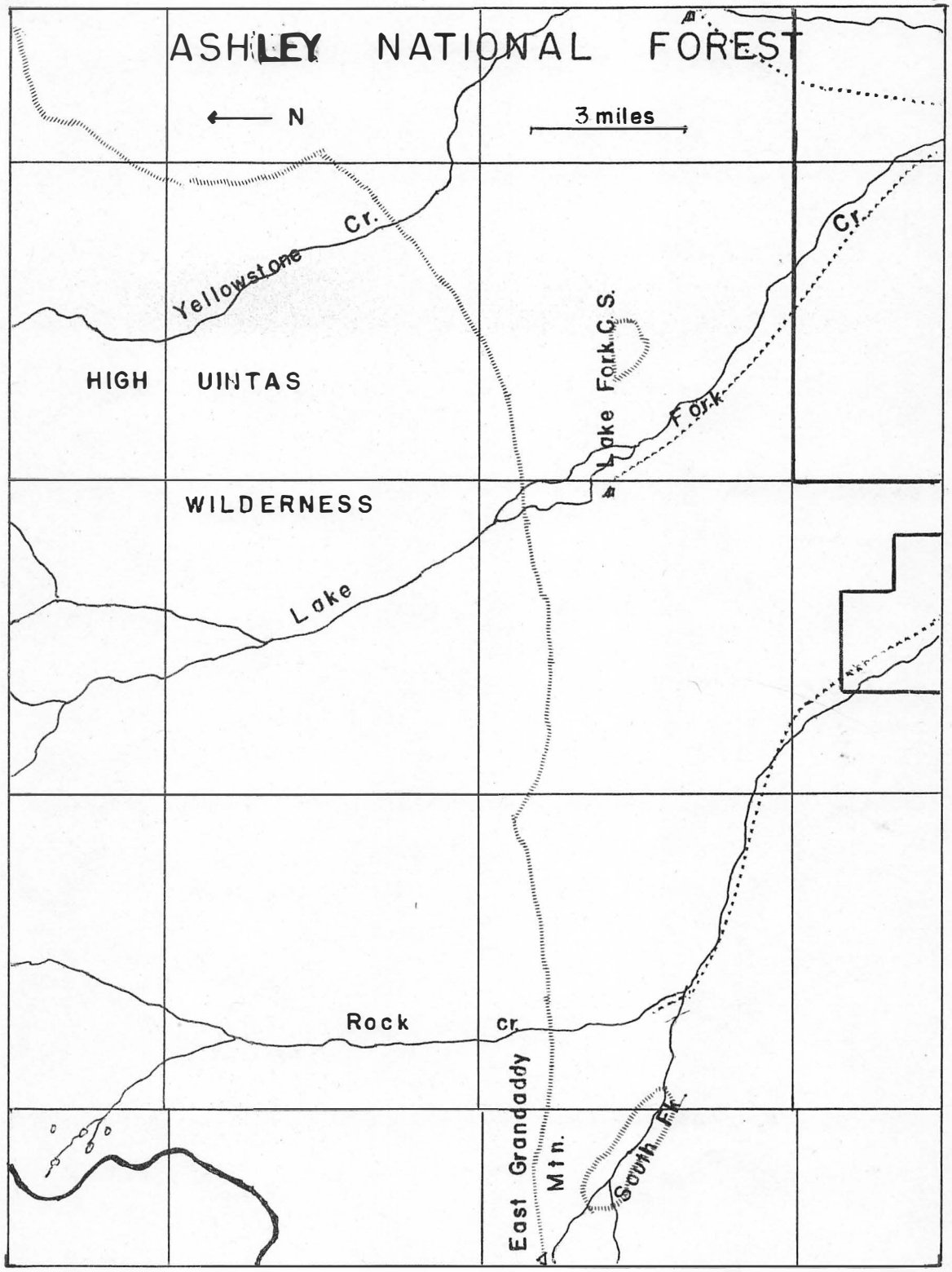

N. Fk. Lake Fk.
PAYETTE
N
2 miles
Upper Payette Lake
N. Fk.
Payette
Riv.
Cr.
Fisher
NATIONAL
Goose Cr.
FOREST
Cr.
Hard
Brown Cr.

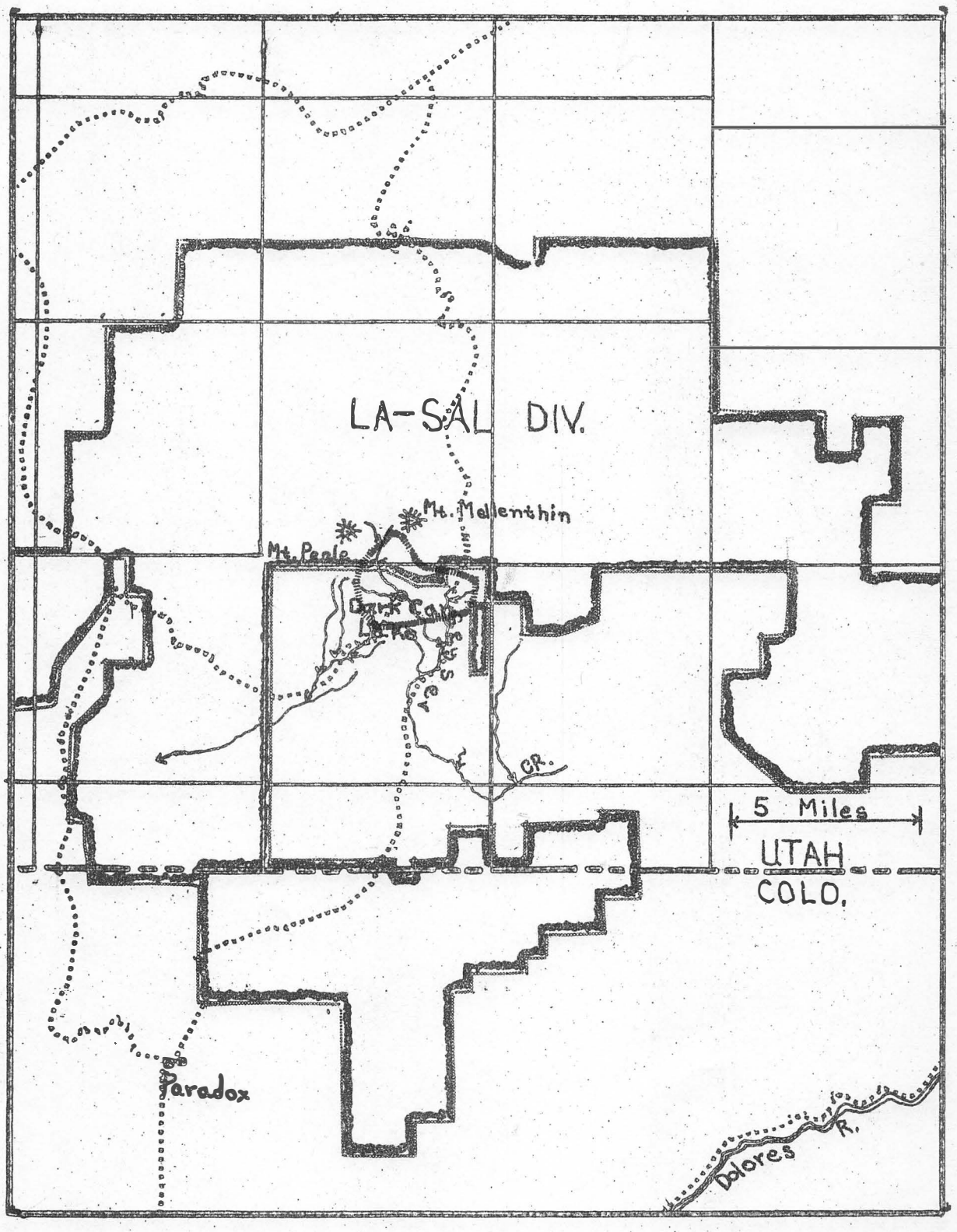

IDAHO
PAYETTE
WILDERNESS
NATIONAL
FOREST
Chicken Pk.
Chamberlain Cr.
Riv.
Salmon
South Fk.
Beaver Cr.
Pilot Pk.
Smith Cr.
Elk Cr

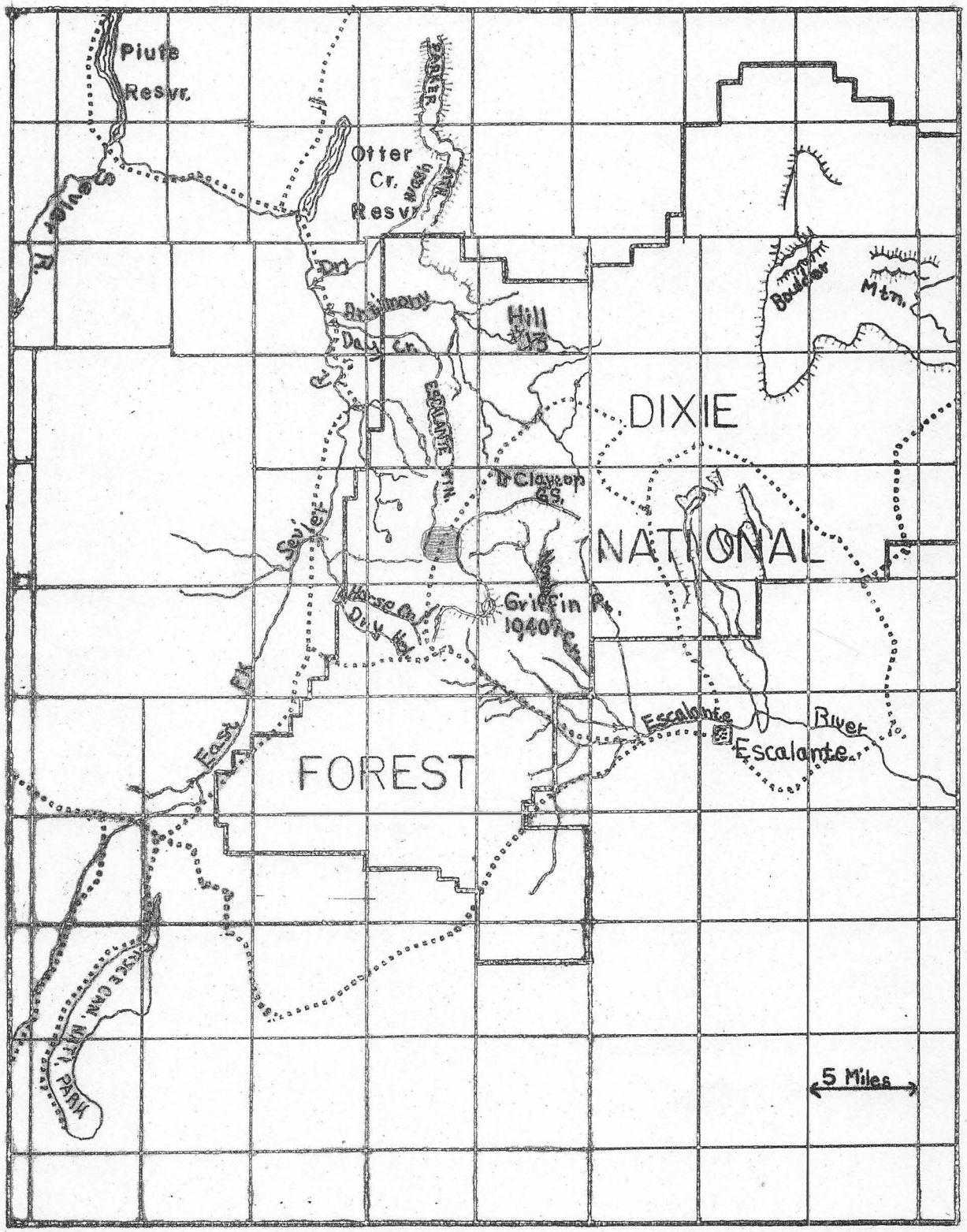

GRAND
TETON
NATL. PARK
BUFFALO
Blackrock R.S.
Blackrock
ELK P.O.
Baldy Mtn.
Spread
Skull
Cr.
Cr.
2 miles
TETON N.F.
Mt Leidy
N


BRIDGER
NATIONAL
FOREST
BRIDGER
PRIMITIVE
AREA
Roaring Fk.
Moose Cr.
Little Sheep Mtn.
Green River Lakes
Big Sheep Mtn.
Gypsum Cr.
Porcupine Cr.
RIVER
Kendall R S
Jim Cr.
New Fork Lakes
GREEN
5 Miles
Willow Lake


WASATCH
NATIONAL
FOREST
KAMAS
PROVO
RIVER
RIVER
HIGH UINTA
WILDERNESS
AREA
5 Miles
N
UINTA
Soapstone
Cr.
Trail
Hole
Rhodes Can.
Swift Cr.
Lake
Basin
Ewans
Draw
Rhodes
Can.
Mill Hol.
Shingle Mill Rd.
Wolf Creek
Bug Camp
Wolf
Cr.
West
Fk.
Fk.
So.
Stockmore
R.S.
NATIONAL
FOREST
ASHLEY NATIONAL
FOREST
DUCHESNE


ASHLEY NATIONAL FOREST
N
3 miles
Yellowstone Cr.
HIGH UINTAS
WILDERNESS
Lake Fork C.S.
Fork
Cr.
Lake
Rock cr.
East Granddaddy Mtn.
South Fk


LA-SAL DIV.
Mt. Mellenthin
Mt. Peale
Dark Canyon Lakes
CR.
5 Miles
UTAH
COLO.
Paradox
Dolores R.


Piute
Resvr.
Otter
Cr.
Resvr.
Sevier R.
Boulder
Mtn.
Hill
13
DIXIE
NATIONAL
FOREST
Escalante
River
Escalante
5 Miles